for using the telescope in the Cassegrain form is 20 in. in diameter. The mounting of the telescope is of the "English" pattern, and permits the observation of all parts of the sky. It is satisfactory to find that the performance of the optical parts, the mounting and the dome, and the character of the seeing are quite equal to, and even exceed, expectation. With the single-prism spectrograph now in use excellent spectra of stars of photographic magnitude 7·0 are secured in about twenty-five minutes, and the change from one star to another can be made in less than five minutes. Canada is to be congratulated on having obtained so fine an instrument for astronomical research.

THE EDUCATION ACT OF 1918 *AND ITS POSSIBILITIES.*

THE Education Act, which received the Royal Assent on August 8, contains within it potentialities of the highest moment for the well-being of the nation, and only needs goodwill and a progressive spirit to realise to the full the ideals of its chief promoter. On the same day that it became law the Board of Education put into legal effect thirty-three out of the fifty-two sections which comprise the Act, some of them of considerable importance as paving the way for the more revolutionary changes which the Act is ultimately designed to accomplish.

The chief sections made immediately operative are intended (7) to remove the limitations as to expenditure from the rates by the council of a county for the purposes of education other than elementary; (8) to empower the education authority to require the attendance of any child at special classes or courses of practical instruction or demonstrations held in other than the school buildings; (15, 16) to enable the authority, upon the report of the medical officer, to prohibit the continued employment of a child, or to alleviate its conditions, where it is shown to be prejudicial to the health and physical development of the child, and to impose penalties on an employer for breach of its by-laws; (17) to authorise the authority to maintain, or to aid the establishment of, school camps, centres, and equipment for physical training, playing fields, school baths and swimming baths, and other facilities for social and physical training in the day or evening; (18) to extend the provision of medical inspection and treatment to other than elementary schools so as to include secondary and continuation schools and other schools and institutions provided by the education authority; (19) to provide or aid the provision of nursery schools for children between two and five years of age, or to a later age, so as to ensure the health, nourishment, and physical welfare of such children; (21, 24) to make suitable provision, inclusive of board and lodging, so as to enable children in exceptional circumstances, such as the remoteness of their homes, or other special conditions, to receive the full benefit of efficient elementary education and to make agreements with the parents accordingly, and to provide, in addition to scholarships for higher education, allowances for maintenance; (23) to empower the education authority to aid research with the view of promoting the efficiency of teaching and advanced study, and of aiding investigation for the advancement of learning; and (34) to acquire land compulsorily for educational purposes, substituting the authority of the Board of Education for that of the Local Government Board; and, further, (35) to provide a public elementary school immediately outside its area for the use of chidren within its area.

A very important provision is made in sections 45, 46, and 47 whereby by an Order in Council the Crown can appoint an official trustee or trustees of educational trust property, which property is relieved of the restrictions imposed by the Mortmain Acts, and its control is now vested in the Board of Education and differentiated from all other charitable trusts. The removal of the limitation in the Act of 1902, whereby the council of a county shall not exceed in its expenditure in respect of higher education a sum out of the rates exceeding *2d.* in the pound—a provision the reason for which it is difficult to understand, seeing that the county boroughs had unlimited powers—will enable the more progressive among these authorities to make much more extensive provision for advanced education; to provide efficient and accessible secondary and special schools in rural areas; to increase the number of scholarships and the means of maintenance, since no child is to be debarred from receiving the benefits of any form of education by his inability to pay fees; to secure due facilities for medical inspection and treatment for children and young persons in secondary and in continuation schools; and to provide all desirable means and opportunities for ensuring social and physical training among those pursuing the various branches of higher and continued education. Already the more advanced and enterprising of the county authorities are busy considering schemes of educational development with a view to their immediate application.

The mandatory powers now assured by the Act to the Board of Education will enable it to require from all local education authorities the provision of schemes for the development and comprehensive organisation of education within their areas, to which, when approved, it shall be the duty of the several authorities to give effect. This marks a great advance upon the Act of 1902, which in this regard was largely permissive in its requirements, of which many laggard authorities took advantage.

The provision of nursery schools will ensure a very large saving of infant life and a much more vigorous child-population, since the children in poor and crowded districts, especially in the industrial areas, will be better fed and cared for and their infantile ailments dealt with effectively. Nor will the medical inspection and treatment of the adolescent in the continuation schools be less beneficial, securing as it will, at a critical period of life, that desirable attention to the health and vigour of the body which will ultimately ensure a much higher standard of virility in the adults of the nation. There is abundant evidence since the advent of the war of the avoidably large percentage of the youthful population who are far below a satisfactory standard of health and vigour arising from neglect in childhood and early youth.

So soon as the Act comes into full operation (which, judging by the course of events of the present war, may happily be within a few months), half-time, which prevails mainly in the textile districts of Lancashire and Yorkshire, and all other exemptions enabling children under fourteen years of age to leave school, will be abolished. Provision is made in the Act for a large extension of the sphere of the elementary school, fees in which are abolished. Central schools may be established in which at appropriate stages practical instruction suitable to the ages, abilities, and requirements of the children must be set up. Courses of advanced instruction for older pupils desirous of remaining at school beyond fourteen years of age must be provided, and measures taken for the preparation of children who desire further education in schools other than elementary and for their transference thereto.

Provision must be made for a sufficient supply of continuation schools, free of all fees, for young

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persons between fourteen and eighteen years of age who are in employment, the instruction in which shall extend, within the working day, to 280 or 320 hours in each year, at the option of the local authority, and be distributed over such times and seasons as may seem desirable; the regulations in respect of young persons between the ages of sixteen and eighteen are, however, not to apply within seven years of the appointed day. When in full operation these continuation-school courses will deal with some two and a quarter millions of young people who have hitherto entirely failed to continue their education. It is gratifying to note that this feature of the Act is already being brought into effect by many large firms in the North of England. The Act further encourages the co-operation and combination of neighbouring authorities in any schemes, especially those relating to higher education. The crux of the Act lies in a due supply of efficient teachers, but with the offer of better salaries, improved prospects, and adequate pensions this essential may be assured.

THE PUBLIC HEALTH.[1]

THE annual survey of the public health of England and Wales by the Medical Officer of the Local Government Board recently issued contains matter of considerable general interest.

The first few pages of the report are devoted to a useful review of events since 1871, the year in which the Local Government Board was established. The data given show clearly the improvement of the public health since that year. For instance, the total death-rate for 1911–15 is from 42 to 50 per cent. less than that obtaining in 1871–80 for all ages up to forty-five, and at every subsequent age-period a substantial reduction has been secured. The number of lives saved *every year,* due to reduction of the death-rate, between 1871–80 and 1910–12 averaged 234,955, and the average expectation of life has increased by ten years for males and by nearly eleven years for females.

Almost all diseases during this period show a reduced mortality, the exceptions being influenza (which was not prevalent in 1871–80), diphtheria, and cancer. Some of this registered increase in the crude death-rate from cancer arises from the higher average age of the population, for cancer becomes more frequent as age advances. A still larger proportion is due to more accurate certification of cause of death, but it is still an open question whether the whole of the increase in the mortality from cancer can be thus explained. Whether so or not, cancer remains one of the chief causes of death in man.

The death-rate in young children has been markedly reduced, and the prevalence of typhoid or enteric fever has also rapidly declined since 1911. The former fact is the best index of combined social and sanitary progress, the latter of general sanitary progress.

The needs of the future are next briefly considered; they are regarded as coming under three principal headings—(1) research into the causation of disease on a much larger scale than has hitherto been attempted; (2) extension of communal action for the prevention and treatment of disease, and more complete training of the medical profession for this work; and (3) simplification and strengthening of administrative machinery.

An important section on maternity and child welfare follows. Attention is directed to the declining birth-rate; in 1917 it was only half that of 1874. In spite of a considerable saving in child-life, the rate of survivors to age five of the total population is a steadily declining figure—from 27·1 per 1000 in 1874 to 19·6 in 1916. The effect of this will be that "unless economic or other considerations having an opposite influence come into play, the population, apart from immigration, will ere long become stationary, the birth-rate not more than counterbalancing the death-rate." Infant mortality, including still-births, is discussed. The infant mortality in 1917 for the whole of England and Wales was 97 per 1000 births, as compared with 91 in 1916, the lowest recorded rate. Judging by the past, it is considered that we may anticipate a reduction of the national rate of infant mortality to 50 per 1000 births—a rate already attained in some parts of the country and in New Zealand as a whole—but this desirable end can be secured only by improving the welfare of every mother.

Succeeding sections of the report deal with (*a*) the prevention of acute infectious diseases, from which we learn that 178 indigenous cases of malaria occurred in 1917; and (*b*) the prevention of chronic infectious diseases, of which tuberculosis is the most important. The total deaths from pulmonary tuberculosis have increased since 1913, and in 1917 the increase was 6058, or about one-sixth more than in 1913. This increase was greater among females, due probably to their more extensive employment in industrial occupations with conditions of strain and overcrowding.

The work of port sanitary authorities is surveyed. Rat destruction has been carried out at the principal ports in view of the connection of these rodents with plague infection; some 110,000 rats have been destroyed in the ports of London, Liverpool, and Hull, and of some 12,000 rats specially examined five were found to be plague-infected.

Appendices contain the reports of inspectors on outbreaks of infectious disease, statistical tables, etc.

R. T. H.

AN INSTITUTE OF PHYSICAL AND CHEMICAL RESEARCH FOR JAPAN.

THE idea long cherished by some of the scientific men in Japan of establishing a national institute of scientific research has, in part at least, been realised—in part, first, because the Institute of Physical and Chemical Research which came into existence as a legal body in March, 1917, does not, as its name implies, cover the whole field of science; and, secondly, because the fund now being raised in its support is not quite sufficient to place the institute upon such a financial basis as was at first contemplated. Nevertheless, it promises a fair start, and, with wise administration and a judicious choice of the staff, it is hoped that the institute may do some useful work for the progress of science and industry.

The outbreak of the great war in 1914, which at once cut off the import, mainly from Germany, of dyestuffs, drugs, and other products of daily necessity, and at one time almost gave rise to a panic in business, was responsible for producing a profound change in the mental attitude of the Government officials, the business men, and, in fact, the whole nation towards science. Those who had in vain been preaching the supreme importance of cultivating science with all activity and pleading for public support now saw at once that the right opportunity presented itself, and lost no time in drawing up a definite plan for an institute of physical and chemical research—a plan which, though not ideal, was deemed to be practicable and to meet the most urgent need. This, fortunately, obtained the cordial support of some of the most influential and public-spirited of the business men, particularly of Baron Shibusawa, and afterwards

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[1] Forty-seventh Annual Report of the Local Government Board, 1917–18. Supplement containing the Report of the Medical Officer for 1917–18.

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